ENVIRON

June 29, 2004

EPA Region 5 Records Ctr.
387527

Mr. Dion Novak
Superfund Division
United States Environmental Protection Agency
77 West Jackson Boulevard
Mail Code: SR-6J
Chicago, IL 60606

Re: Response to Comments
Draft Human Health Risk Assessment
Eagle Zinc Company Site, Hillsboro, Illinois

Dear Mr. Novak:

As requested in Thomas Krueger's June 8, 2004 letter to Ross Jones, this letter provides detailed responses to the U.S. Environmental Protection Agency's (EPA's) May 2, 2004 comments concerning the March 2004 Draft Human Health Risk Assessment (HHRA) for the Eagle Zinc Company Site in Hillsboro, Illinois (ENVIRON 2004), including proposed text changes to the draft report. These responses reflect our understanding of agreements reached with EPA and/or CH2M Hill personnel on behalf of EPA during our June 2, 2004 meeting, as well as during telephone conversations with Mr. John Lowe of CH2M Hill on June 25 and 29, 2004. Based on these communications, and in particular our conversation with Mr. Lowe on June 29, 2004, we understand that the responses below resolve EPA's concerns with the HHRA.

EPA's comments are restated below, followed by ENVIRON's responses.

GENERAL COMMENTS:

At the February meeting at EPA, EPA specifically stated that a future residential scenario at the site including appropriate risk calculations was to be provided-this was not included. The document includes a justification for not including the residential scenario as the Superfund Ready for Reuse guidance. EPA stated that this was inappropriate.

Response: Please see responses to Specific Comments 1, 2, and 15.

Concentrations of lead and cadmium are elevated in a few off-site sediment samples. However, no risk calculations were done for these samples.

Response: Please see responses to Specific Comments 4, 23, and 33.

Exposure point concentrations in soil appear to be averaged across the site, which will result in the HHRA missing potential hot spot areas. Not all of the sampled media (particularly residue pile samples) have been included in the risk assessment.

Response: Please see responses to Specific Comments 20, 22, and 26.

The analysis of potential inhalation exposures and risks does not appropriately represent site conditions. An expanded air pathway analysis may be required to assure that risks from dust emissions both on and off-site are properly addressed. Screening levels based on inhalation exposure pathways will need to be recalculated to incorporate the results from the revised air pathway analysis.

Response: Please see responses to Specific Comments 19, 28, and 38.

In addition, the HHRA does not include the off-site garden exposure scenario previously requested by EPA.

Response: Please see responses to Specific Comments 12, 22, and 28.

Some of the screening levels have been calculated using inappropriate toxicity values, and will need to be recalculated.

Response: Please see responses to Specific Comments 35 and 36.

Documentation of portions of the HHRA methodology is not adequate to verify that those portions were implemented correctly.

Response: Please see responses to Specific Comments 18, 19, 20, 22, 28, 30, 32, 33, 37, and 38.

SPECIFIC COMMENTS:

1. Page ES-1, paragraph 3: Delete the last sentence making reference to the Superfund RfR guidance. This statement would be appropriate in the Feasibility Study. It is not appropriate in the HHRA.

   Response: The Respondents believe that the Superfund RfR guidance is applicable to this Site and relevant to the approach taken in the HHRA. Nonetheless, this sentence will be deleted in the revised HHRA.

2. Page ES-2, Paragraph 1, bulleted list of exposure scenarios evaluated: The list of exposure scenarios does not include the On-Site Resident. In previous correspondence and in the February 18, 2004 meeting, it had been communicated by EPA that the HHRA include calculation of risks for the On-Site Resident scenario.

   Response: Anticipating satisfaction of the conditions prescribed in the June 8, 2004 letter from Thomas Krueger, Esq. of the EPA to Ross Jones of ENVIRON regarding imposition of an enforceable deed restriction limiting future development of the Site to commercial/industrial uses, the future on-Site residential scenario will not be

evaluated in the HHRA. Therefore, no change will be made to the list of exposure scenarios.

3. Page ES-3, Paragraph 1: The stated risk assessment approach involves calculation of risk-based screening levels associated with specific exposure pathways and exposure factors. To account for cumulative exposures and risks, the screening levels and exposure point concentrations are used to calculate ratios that represent total pathway risk from multiple chemicals. It is stated that total risk/hazards are calculated in each exposure media, and are summed across all media to obtain a cumulative risk estimate for each scenario. This appears to address previously raised concerns that the HHRA provides cumulative risk estimates, even though this approach is substantially different, both conceptually and computationally from USEPA's *Risk Assessment Guidance for Superfund, Part A*. Please incorporate into the HHRA reference to USEPA's Region 9 PRG documentation, which incorporates a procedure for calculating cumulative risk estimates using risk-based screening levels.

   Response: As requested, the second sentence of the first full paragraph on page ES-3 will be modified as indicated in italics: "To account for simultaneous exposure to multiple COPCs, the risks/hazards calculated for each individual compound and exposure route in a given exposure medium were summed to obtain a total exposure pathway risk *(EPA Region IX 2002)*."

   The terms "screening level cancer risks" and "screening level hazard indices" are used throughout this document. However, the authors do not: 1) identify where these represent terminology derived from risk assessment guidance, or 2) state the outcome of a screening level analysis, which is to propose a more detailed and refined risk assessment, if needed, based on the screening level results. Please revise the text to focus on more transparently characterizing the uncertainties and conservatism in the numerical risk estimates rather than dismissing those estimates as "screening level", implying that they are significantly exaggerated in some unsubstantiated fashion. Please delete references to "screening level cancer risks (SLCRs)" and "screening level hazard quotients (SLHQ)" throughout the document.

   Response: As discussed during the June 2, 2004 meeting, uncertainties associated with each step of the HHRA are discussed in each major section (Sections II.D, III.E, IV.D, and VI.D). The terminology used to refer to Tier 1 screening-level cancer risks and hazard quotients and indices will be changed from "screening-level" to "Tier 1" throughout the HHRA.

4. Page ES-3 par 2. Please reword the third sentence (starting with "Because the area of affected sediment. . .) as follows: *". . . by occasional contact with sediment, the finding that individual sample results exceed a residential screening level for lead does not necessarily indicate that there is an elevated risk associated with lead in sediment.*"

Response: As requested, the second to the last sentence of the second full paragraph on page ES-3 will be modified as indicated in strikeout (deletion) and italics (addition): Because the area of affected sediment is very limited and the *Tier 1* screening level is based on a much more intensive exposure regime than could occur by occasional contact with sediment, the fact that the ~~representative sediment concentration is exceeded cannot be interpreted as indicating risk~~ *individual sample results exceed a residential screening level for lead does not necessarily indicate that there is an elevated risk associated with lead in sediment.*"

Risks to off-Site residents from lead and cadmium in sediments need to be calculated and incorporated into the HHRA.

Response: Please see response to Specific Comment 33.

It states in the last sentence that further characterization may be needed to evaluate the levels for lead in sediment but nowhere in the document are any recommendations on how to collect this additional information.

Response: The last sentence of the second full paragraph on page ES-3 will be modified as indicated in italics: "However, the fact that lead levels are elevated in this area may warrant further evaluation *in the ecological risk assessment for the Site* (ENVIRON 2004)."

5. Page ES-3 par 3. What are the site background values for arsenic? It is not acceptable to use a regional background value for arsenic without any site specific data and then rule out arsenic based on regional background values.

   Response: As indicated in Table 3 of the HHRA, arsenic was retained and carried through the HHRA as a soil COPC because the maximum detected concentration exceeded the Illinois background level

6. Page ES-3, Paragraph 4: Please delete the words "significantly exaggerate" and replace with the work "overstate". Please see general comment regarding the need for on-site residential exposure calculations.

   Response: As requested, the second sentence of the last paragraph on page ES-3 will be modified as indicated in strikeout (deletion) and italics (addition):
   "As a result, the cumulative *Tier 1* CRs/HIs for the defined receptor populations at the Site are likely to ~~significantly exaggerate~~ *overstate* potential risks/hazards."
   Please also see response to Specific Comment 2.

7. Page ES-6 Industrial worker. Exposure to subsurface soils is a reasonable exposure for future workers, due to facilities related construction activities.

   Response: The "Pathway Considered Complete?" box for On-Site Industrial Worker exposure to subsurface soil in Table ES-3 will be changed from "No" to "Yes," and

the "Rationale/Comment" will be replaced with the following text: "Although workers would not contact subsurface soil under current conditions, it is possible that they could contact excavated material in the future. Because the representative concentrations of COPCs in on-Site soil include both surface and subsurface samples, potential contact with subsurface material is accounted for."

8. Page ES-6 Trespasser. Exposure to contaminated sediments is a potential pathway and should not be ruled out because of detected contamination.

   Response: As indicated in Table ES-3, ingestion of sediment by Trespassers is considered a complete exposure pathway in the HHRA. As agreed with Mr. Lowe in our June 29, 2004 telephone conversation, dermal exposure to aquatic sediment need not be considered quantitatively in the HHRA due to the transient nature of such contact in the presence of water.

9. Page 1, Paragraph 3, 1st bullet: The first objective of the HHRA is to provide an analysis of potential risks assuming no remedial action or institutional control, as stated here. This is consistent with EPA's previous comment re:on-Site resident risk calculation.

   Response: Please see response to Specific Comment 2.

10. Page 1, Paragraph 4: Please delete this paragraph referring to the Guidance for Preparing Superfund RfR Determination. This information is more appropriately presented in a Feasibility Study because it addresses identification of a potential remedial technology (implementation of institutional controls).

    Response: Please see response to Specific Comment 1.

11. Page 4, Section D: The concept of target levels and their use in this document deviates from the *Risk Assessment Guidance for Superfund* documents used for preparation of a baseline risk assessment. At our February meeting, EPA specifically stated that this concept required substantial justification for use at the site. No justification has been provided.

    Response: As discussed and agreed at the meeting on June 2, 2004, the tiered approach for the HHRA defined in the HHRA (Section I.D, Figure 3) is consistent with Superfund guidance, as exemplified by *Risk Assessment Guidance for Superfund: Volume I, Part B* (EPA 1991)[1], *Soil Screening Guidance: User's Guide*

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[1] EPA (1991). *Risk Assessment Guidance for Superfund Volume I – Human Health Evaluation Manual (Part B, Development of Risk-Based Preliminary Remediation Goals.* EPA/540/R-92/003.

(EPA 1996)[2], and *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites* (EPA 2002)[3] and is acceptable for use at the Site.

12. Table 1: Exposure pathways for an on-Site resident scenario are judged to be incomplete. While this is correct under current land use, it is not appropriate for purposes of the HHRA to categorically rule out an on-Site residential scenario under future land use. Please add information to this table noting that exposure pathways are potentially complete to an on-Site resident under future land use conditions.

    Response: Please see response to Specific Comment 2.

    Exposure pathways from soil for an off-Site resident cannot be deemed incomplete without more detailed justification.

    Response: Please see response to Specific Comment 22.

    Please include an exposure pathway from ingestion of garden-raised fruits and vegetables for the off-Site resident.

    Response: Please see response to Specific Comment 22.

13. Page 5, Paragraph 1: Please delete the last sentence of the paragraph. It is not needed for the risk assessment to be useable for decision makers.

    Response: This sentence reflects the commonly accepted practice of applying alternative health-protective target risk/hazard levels, if warranted, in a second tier of risk assessment. Nonetheless, this sentence will be deleted.

14. Page 5, Paragraph 2: Please delete this paragraph. It does not correctly depict how the results of the risk assessment will be used to support Site decision-making. It is anticipated that cumulative risk estimates, aggregated across all exposure pathways and chemicals, for each scenario will be compared with the guidance provided in the *Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions*, OSWER Directive 9355.0-30, April 22, 1991.

    Response: To better reflect the manner in which cumulative risk estimates are used in decision-making in the HHRA, the second paragraph on page 5 will be modified as indicated in strikeout (deletion) and italics (addition): "No further risk assessment will be performed for areas where ~~representative concentrations of COPCs~~ *cumulative Tier 2 hazards/risks* are below ~~remedial~~ acceptable target levels. Where these levels are exceeded, interim or final remedial strategies may be considered."

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[2] EPA (1996). *Soil Screening Guidance: User's Guide*. Second edition. Publication 9355.4-23.
[3] EPA (2002). *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites*. OSWER 9355.4-24.

In keeping with this change, the last paragraph of Section I.D.1 (page 4) will also be modified as follows: "Because of the conservatism of Tier 1 screening levels, no further risk assessment will be performed for areas where ~~representative concentrations of COPCs~~ *cumulative Tier 1 hazards/risks* are below ~~these~~ *acceptable target* levels. For areas where ~~Tier 1 screening~~ *target hazard/risk* levels ~~for any potentially complete exposure pathways~~ are exceeded, interim or final remedial action may be considered, or a Tier 2 assessment may be performed."

Please delete Figure 3 from the document, because it also does not correctly depict how the results of the risk assessment will be used to support Site decision-making.

Response: In keeping with the changes described above, Figure 3 will also be modified accordingly.

15. Page 8 indented paragraph. In our February meeting, EPA indicated that substantial documentation was required before this statement could be considered for use in the risk assessment-this was not provided. There are several caveats included in this statement which place substantial conditions on future site use. The first is that this scenario is contingent on a mutually acceptable agreement between the site owners and the City of Hillsboro. The second is that the environmental aspects of the property need to be acceptable to both parties before property transfer is completed. This has nothing to do with calculation of risks and is entirely dependent on the final remedy decision at the site, which is well in the future. Therefore, if this statement is to be considered further, the following two stipulations must be included: 1) Institutional controls must be placed on the property immediately by the current owner restricting any future use at the site to commercial/industrial and 2) all conditions that EPA has highlighted in this comment must be removed from this statement from the Planning Commission.

    Response: In keeping with the response to Specific Comment 2, after the first full sentence on page 8, the remainder of Section II.A.2 will be replaced with the following text: "T.L. Diamond will record an enforceable deed restriction on the entire property that will run with the land and will limit future use of the property to industrial/commercial purposes. Documentation from the City of Hillsboro that it supports the deed restriction and that it intends that the property will be used for industrial purposes as part of its overall comprehensive plan is provided as Attachment _. Therefore, this HHRA is based on the assumption that future land use at the Site will remain commercial/industrial, and does not include consideration of hypothetical future residential development."

16. Page 8, 1st full paragraph: Please delete the next to last sentence in the paragraph (which starts "As such, it suggests the applicability. . ."). Please reword the last sentence in the paragraph (which starts "Therefore, this HHRA is based on. . .") as follows: "Therefore, this HHRA includes a commercial/industrial land scenario based on the assumption that future land use at the Site will remain commercial/industrial."

Response: Please see response to Specific Comment 15.

17. Table 2: Correct the units on the tap water action levels from mg/L to ug/L.

    Response: This typographical error will be corrected.

18. Page 9, Paragraph 1: This sentence states, "Screening levels for selection of COPCs in soil and sediment are defined as the lower of Illinois background levels and EPA Region 3's Risk-Based Concentrations (RBCs)". It seems that the sentence should read, ". . . defined as the *higher* of Illinois background levels and EPA Region 3's Risk Based Concentrations. . ." in order to be consistent with how data were screened. In particular, the executive summary noted that arsenic concentrations were screened against the background level and not the RBCs. Which is correct?

    Response: The first sentence of the first full paragraph on page 9 will be modified as indicated in strikeout (deletion) and italics (addition): "Screening levels for selection of COPCs in soil and sediment are defined as the ~~lower~~ *higher* of Illinois background levels *(if available)* and EPA Region 3's Risk-Based Concentrations (RBCs) for the default residential exposure scenario (EPA Region 3 2003a)."

19. Page 10, Paragraph 3: The risk assessment has not included all of the data collected from the site in identifying COPCs. In particular, the historical data from the residue sampling piles (see Table 5 of the 2002 *Preliminary Site Evaluation Report*) are not presented and evaluated in the risk assessment. Please include the historical sampling results in the preliminary site evaluation report in the COPC screening.

    Response: As agreed by Roy Ball of ENVIRON and you by telephone on June 14, 2004, residue material is not currently subject to consideration in the HHRA for the Site.

20. Pages 10 and 11, Section C: Additional information is requested to verify that the exposure point concentrations presented in Table 8 have been estimated correctly. Please provide a list of samples used to develop the average concentrations in sediment and soil.

    Response: As requested, analytical data will be appended to the HHRA report, and methods for calculating representative concentration calculations shown. Please see also the response to Specific Comment 22.

    Please include the historical residue pile data provided in the *Preliminary Site Evaluation Report* (see Table 5 of that report), and characterize potential risks associated with contact with the residue piles as separate exposure units.

    Response: Please see response to Specific Comment 19.

Please provide a description of the size of the exposure units in soil and sediment represented by the average concentrations. Note that in the Phase I Technical Memorandum, *Remedial Investigation Phase I: Source Characterization*, onsite media (soils) are divided into several investigation areas (see Figure IV-3), which should be regarded as exposure units. Please calculate exposure point concentrations for each of these areas for purposes of characterizing health risks.

Response: The "Area" designations used in the soil boring/sample identification numbers were first used in 1998 during soil investigations conducted by a previous consultant under an Interim Consent Order with the Illinois EPA. While no rationale was provided for these area designations, they appear to be based on general conditions in the area at that time (*i.e.*, presence or absence of residue piles, etc.). Because these areas do not represent actual or anticipated human activity patterns, we do not believe that they constitute "exposure units." In fact, we anticipate that the entire Site, including areas not yet built upon, will be used for industrial purposes. Further, the maximum number of samples collected in any given area is 5, precluding statistical characterization of long-term exposures. Therefore, as agreed with Mr. Lowe in our conversation of June 29, 2004, an explanation of our rationale for considering the entire site as the exposure unit will be added to the discussion in Section II.C, as discussed in the response to Specific Comment 22.

Please describe the statistical methods used to test the distributions before calculation of the UCLs. For each contaminant and media, please note if the exposure point concentration is based on a distribution (i.e., UCL on the average), the maximum concentration, or a concentration from a sample location within an exposure pathway. Note that USEPA has issued guidance in 2002 (*Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites*, OSWER 9285.6-10, December 2002) for calculating exposure point concentrations that may supersede the 1992 guidance cited in the HHRA.

Response: As indicated in the response to Specific Comment 20, the data sets and methods used to calculate representative concentrations in soil and groundwater will be provided as attachments to the revised HHRA. The updated EPA guidance document will be cited.

All data should be included in risk assessment calculations.

Response: All valid soil data were used in the HHRA calculations. Assuming that this statement refers to inclusion of residue pile data, please see response to Specific Comment 19.

21. Figure 2: Please make the following corrections to the conceptual model of exposure pathways: 1) include as a complete exposure pathway direct contact with surface soil to a resident; 2) show the "particle suspension --> air flow/wind --> surface soil"

pathway as complete to an offsite resident; 3) add residue piles as an exposure media to onsite receptors.

Response: Please see responses to (respectively) Specific Comments 15, 28, and 19.

22. Page 13, Paragraph 3 (Section III.A.). Description of potential contaminant source areas is not adequate for purposes of understanding how sampling and analytical data represents potential exposures to human or ecological receptors. For example, on-site soil samples appear to have been collected beneath residue layers that are apparently on the surface (see Table II-1, Soil Sampling Summary in the Phase I Technical Memorandum). Please update this section to define where soil samples have been collected.

Response: At the June 2, 2004 meeting, the Parties reminded EPA of the existing data, which demonstrate that off-Site soil has been shown to have no impacts attributable to releases from the Site. EPA did not dispute the Parties' position at the June 2, 2004 meeting, noting that EPA would consider it further. Because EPA has not since indicated that the Parties' position has been found unacceptable, this part of this comment will be addressed by replacing the second full paragraph on page 11 (Section II.C) with the following text: "The 95% UCLs were calculated as described above only for on-Site soil and ground water. As discussed in the Phase 1 Technical Memorandum (ENVIRON 2003a), available data and information concerning the residue piles do not suggest that air deposition has impacted off-Site areas. A detailed evaluation of all historical data for the Site, including the off-Site soil data collected by IEPA in 1993 as part of the CERCLA Expanded Site Inspection (ESI), indicated that no constituent concentrations detected in off-Site soils were determined to be significantly different from Site-specific background levels. While arsenic concentrations were determined to be different from the level detected in a local background sample, the highest detected concentration was only marginally above the average regional background level, as reflected by the non-Metropolitan Statistical Area (MSA) background value presented in the Illinois Tiered Approach to Corrective Action Objectives (TACO). In addition, arsenic is not known to have been used or released at the Site. As the off-Site soil samples collected by IEPA in 1993 were well-distributed around the Site, the available data do not indicate any detectable impacts to off-Site soils from constituents associated with the Site. The original Statement of Work for the RI/FS did not include off-Site soil sampling because the historical data did not suggest that this was a potential area of concern. Subsequent evaluation of possible migration pathways to off-Site soils documented in the technical memoranda (ENVIRON 2003a&b) also did not indicate a need for collection of off-Site soil data. Therefore, off-Site soil was not considered as a potential exposure medium in the HHRA."

As agreed with Mr. Lowe in our telephone conversations of June 25 and 29, 2004, the following paragraphs will be added to further describe the on-Site soil, sediment, and surface water data sets, and those data used to characterize potential exposures to COPCs in surface water and sediment in Lake Hillsboro: "To characterize

constituent concentrations in on-Site soils, a specific number of borings (established in the SOW and RI/FS Work Plan) were completed at locations randomly selected from a 50 x 50-foot grid within each of seven areas of the Site (Areas 1-4, Manufacturing Area, Western Area, Northern Area). Because these areas do not represent actual or anticipated human activity patterns, receptor presence is considered equally likely in all areas, and sample locations were biased to locations exhibiting elevated XRF field screening levels, all available soil data were combined to calculate representative concentrations of soil COPCs for use in the HHRA. None of the borings were conducted through residue piles; however, some of the borings randomly fell within areas containing accumulations of surficial residues. Soils from each boring were screened for metals using XRF and organic vapors using a PID. The EPA-approved sampling methodology (also established in the SOW and RI/FS Work Plan) involved retaining samples for laboratory TAL Metals analysis from a specific number of borings exhibiting the highest metals concentrations determined using XRF. The soil samples for laboratory analysis were collected immediately below any surface residues present at the randomly selected location. Based on a lack of PID screening results above background levels, a subset of the TAL Metals samples was randomly selected for analysis of TCL Organics and PCBs. The locations of the soil borings, borings for which soils were retained for laboratory analysis, and concentrations detected above conservative screening levels used to evaluate the data are shown on Figure IV-1 of the March 2003 Phase 1 Technical Memorandum. Soil data and representative concentration calculations are presented in Attachment _.

Constituents present in groundwater were characterized from samples taken in March of 2003 in all newly installed permanent and temporary monitoring wells and all pre-existing wells, except for wells MW-A, MW-B, MW-D, MW-E, and G-108. All of the wells were sampled for TAL metals and sulfate. In addition, four of the ground water samples (MW1, MW4, MW8, and G107) were analyzed for TCL organic compounds and PCBs. The metals analyses were conducted using both field-filtered and unfiltered samples to determine dissolved and total metals concentrations, respectively. Groundwater data and representative concentration calculations are presented in Attachment _.

No determination of UCLs was performed for surface water and sediment locations since only data from the surface water and sediment sampling locations closest to Lake Hillsboro (SW-ED-16 and SD-ED-16, respectively) were used to characterize potential exposure of people using the Lake for drinking water, fishing, or recreational purposes. The maximum concentrations of COPCs in the surface water and sediment samples taken in the southwestern area of the Site (near the pond) were used as representative concentrations for Trespasser exposure. The values, UCLs or maximum detected concentrations, used as representative concentrations in potential exposure media are presented in Table 8."

Residue pile results from sampling conducted in 1998 (presented in the Preliminary Site Evaluation Report) detected elevated concentrations of lead. Please include a description of the residue data to this section.

Response: Please see response to Specific Comment 19.

23. Table 8: Add exposure point concentrations in soil and sediment for child and adult residents.

Response: As agreed during the June 2, 2004 meeting and subsequent telephone conversations, soil contact is not a complete exposure pathway for residents either on- or off-Site as (1) off-Site soils have not been impacted by the Site (please see response to Specific Comment 22), and (2) on-Site residential development is not a reasonably anticipated future land use (please see response to Specific Comments 2 and 15). Area residents may contact sediments during recreational activities in Lake Hillsboro, but as indicated in the response to Specific Comment 33, the drainageways in the immediate Site vicinity are not readily accessible or physically suitable for recreational purposes.

24. Table 9: The source for the calculated PEF is listed as Equation B-8 in EPA, 2002a. The value is produced by Equation 6 on Page 27. Please provide the correct citation.

Response: The citation will be corrected to read "Calculated per Equation 4-5 of EPA (2002b)."

25. Page 14, Section C (potential receptor populations): Add Off-Site Residents (future) to the list of receptors. As is stated previously, the contingencies currently placed on the potential sale of the property. If this potential acquisition is not completed, or another potential developer comes forward, the potential for other site uses is increased significantly so the calculation of baseline risk for the on-site residential scenario becomes more critical.

Response: We assume that this comment intends to request addition of *On*-Site Residents (future) to the list of potential receptor populations. Please see responses to Specific Comments 2 and 15.

26. Page 15 1st 4 lines. Worker exposure risk calculations should be based on exposure to maximum contaminant concentrations, not an average across the site.

Response: As explained in Section II.C of the HHRA, representative concentrations of COPCs in on-Site soil were calculated in accordance with EPA guidance as the lesser of the 95% upper confidence limit of the mean and the maximum detected concentration, not the average. Please also see response to Specific Comment 22.

27. Page 15 trespasser. What about the VOC concentrations in the drainage ditch leading to the SW pond? What is the risk associated with exposure?

Response: Potential risks to Trespassers associated with TCE in the southwest pond area were calculated (please see HHRA Tables 8 and 25 and page 11, second full paragraph).

28. Page 15 off-site resident. Please see previous comment about air impacts from the residue piles.

Response: At the June 2, 2004 meeting, the Parties reminded EPA of the existing data, which demonstrate that off-Site soil has been shown to have no impacts attributable to releases from the Site. EPA did not dispute the Parties' position at the June 2, 2004 meeting, noting that EPA would consider it further. Because EPA has not since indicated that the Parties' position has been found unacceptable, the following text will be added to the end of Section III.B (page 14 of the HHRA) (please also see response to the first part of Specific Comment 22): "As discussed in Section IV.D of the March 2003 Phase 1 Technical Memorandum, available data and information concerning the residue piles indicate that air deposition does not appear to have impacted off-Site areas. The prevailing wind direction is from the south and south-southwest. Therefore, any impact would be the greatest in the area immediately north or north-northeast of the areas used for residue storage. A previous investigation conducted by IEPA addressed this issue through the collection of off-Site surficial soil samples (see Section II.C). None of these data suggest that off-Site migration of contaminants through wind deposition has occurred. Since no on-Site soil impacts in the Northern Area of investigation were identified in the Phase I investigation, and existing off-Site data show no impacts, off-Site air erosion of residue piles and subsequent deposition is not considered a viable contaminant transport pathway at the Site."

In keeping with this change, Section III.D.1 will be replaced with the following text: "Direct exposure to on-Site COPCs in soil is possible for receptors located on-Site (commercial/industrial worker, construction worker, and trespasser) via:

- Incidental ingestion of surface and/or subsurface soil;
- Dermal contact with surface and/or subsurface soil; and
- Inhalation of respirable dust particles that have become entrained in the air.

As discussed in Sections III.B and III.C, available data and information indicate that off-Site soils have not been impacted by the Site, and that residue piles are not sources of airborne dust either on- or off-Site."

29. Page 16, last paragraph: Delete the discussion of proximity and location of off-Site deposition impacts based on prevailing wind direction (3rd, 4th and 5th sentence in the paragraph). Not detecting visible deposition in the downwind direction is not credible evidence that there is no off-Site deposition of contaminants. The Preliminary Site Evaluation report states, "the existing residue piles do not appear to be a source of airborne dust emissions. These observations include the relatively

large grain size of the materials exposed at the surface of the stockpiles, the consolidated/compacted nature of the older stockpiles and no observed a airborne dust in the areas of the piles during windy conditions. Potential impacts resulting from historical emissions will be evaluated through soil investigations proposed for the RI/FS Work Plan" (see pages 20-21). However, the investigations conducted during the RI do not appear to have addressed this pathway, and the HHRA do not provide any data to support these assertions. Please state in the HHRA conclusions that the exposure pathway from dust resuspension from the piles and deposition onto offsite soils is potentially complete, and that risks through this pathway have not been quantified (this should be completed as an additional exposure pathway). Also state that this uncertainty potentially leads to risks being understated from the residue piles. There are data gaps that preclude conducting a meaningful air pathway analysis, however, it is not proposed that the risk assessment be delayed to collect those data for an air pathway analysis. Additional data to evaluate the potential offsite air pathway can be collected as a part of the FS or during remedial design.

Response: Please see response to Specific Comments 22 and 28.

30. Page 18 2nd full par. Language regarding the significance of the groundwater pathway related to contaminant levels below Environ's screening levels is inappropriate for use in the HHRA. Baseline risks are to be calculated to allow the Agencies current information from which to based remedial alternatives screening on.

Response: As agreed with Mr. Lowe in our June 25, 2004 discussion, this comment will be addressed by modifying the first full paragraph on page 18 as indicated in strikeout (deletion) and italics (addition): "Based on the available information, it is concluded that potable ground water is not a complete exposure pathway ~~for COPCs. As shown in Tables 5 and 7, available data indicate little impact to ground water, with no organic compounds other than caprolactam detected and none detected above the Region 3 RBCs.~~ Since no *volatile* organic compounds were detected above RBCs, the volatilization from the ground water exposure pathway was also considered to be incomplete."

31. Page 19 1st 5 lines. Previous NPDES sampling did not include the contaminants that are part of the current sampling program at the site. The statement about ongoing discharges is not substantiated and should be modified.

Response: As requested, the first two complete sentences on page 19 will be deleted.

32. Page 19, Paragraph 2: Were ingestion and dermal contact of Lake Hillsboro surface water considered to be complete exposure pathways and quantified in the risk assessment? Please add a statement clarifying this point.

Response: Ingestion of and dermal contact with Lake Hillsboro surface water were considered to be complete exposure routes for the Recreational Bather and Off-Site Resident receptor scenarios, as indicated in Tables 1, 12, 13, 26 and 27 and Sections

V.B.1, V.B.2, and V.B.3 of the HHRA. As agreed with Mr. Lowe in our discussion on June 25, 2004, this will be clarified by modifying the first sentence of the first full paragraph on page 19 as indicated in strikeout (deletion) and italics (addition): "Although significant off-Site transport may no longer be occurring, individuals could encounter COPCs in surface water impacted by historical releases during recreational activities (*i.e.*, Trespassers *in the area of the southwest pond* and Off-Site Recreational Bathers *in Lake Hillsboro*) or through consumption of fish caught in ~~affected waters~~ *Lake Hillsboro* (Off-Site Fishers)."

33. Page 19, Paragraph 3: Insufficient justification is provided for not quantifying risks from contact with sediments in on- and off-Site surface water bodies. According to Table 4, the maximum concentration of cadmium in sediment is 550 mg/kg, and the maximum concentration of lead is 2,700 mg/kg. These values are well above screening levels, and the HHRA identified these and other metals as COPCs in sediment. Please quantify potential ingestion and dermal exposures to off-Site residents (adult and child).

    Response: As agreed with Mr. Lowe in our telephone conversation on June 25, 2004, the exposure scenarios considered in the HHRA will be clarified by inserting the following text after the first sentence of the second paragraph below the bulleted items in Section III.C of the HHRA: "The off-Site portion of the Western Drainageway immediately downstream of the southwest pond is not known to be used, nor does it have a reasonable potential to be used, for recreational purposes. The stream is intermittent (has been observed to be nearly dry during summer months) and small (typically 5-6 feet wide and several inches deep when flowing). The portion of the drainageway immediately west of the site is relatively inaccessible, as it is located in an area that is: (1) heavily overgrown with brush; (2) extremely marshy; (3) in a basin that is surrounded to the north, south and east by steep upward slopes; and (4) located on private property, most of which is owned by Fuller Brothers Concrete. No residential properties are intersected by, or back directly up to the drainageway. Therefore, regular recreational bathing by area residents is assumed to occur in Lake Hillsboro."

    On page 15 of the HHRA, the following sentence will be added to the Trespasser bullet: "As indicated in Section II.C, the maximum concentrations of COPCs in surface water and sediment samples taken in the southwestern area of the Site (near the pond) were used as representative concentrations for this receptor scenario."

34. Page 19, Section E: Include a statement in this section pointing the reader to Section V for the equations used in developing the screening levels.

    Response: The last sentence of this section (on page 20) contains this reference.

35. Table 15 (cadmium and manganese RfDs): Please recalculate screening levels for cadmium in soil and sediment using the oral RfD of 0.0005 mg/kg-day. There are no data indicating that the gastrointestinal (GI) absorption of cadmium from soil is the

same as the GI absorption from food. Please recalculate screening levels for manganese in soil and sediment using the oral RfD of 0.047 mg/kg-day. According to the IRIS profile for manganese, the 0.047 mg/kg-day value should be used to characterize risks from manganese in soil.

Response: In accordance with the recommendation in IRIS profile for manganese, the water-based oral RfD will be used to evaluate exposures to this metal in soil and sediment.

However, as agreed with Mr. Lowe in our June 25, 2004 telephone conversation and confirmed in further discussion on June 29th, because EPA uses the food-based RfD for cadmium to calculate its soil screening level for this metal (Table 1, page 10 of EPA (1996) *Soil Screening Guidance: Technical Background Document*), use of the food-based RfD is appropriate for this HHRA.

36. Table 15 (TCE toxicity values): The citation for the TCE toxicity values is incorrect. The values presented in the table are not recommended by NCEA. Toxicity values for TCE have been withdrawn from IRIS, and no new values are available at this time. Revised toxicity values for TCE are currently being reassessed by USEPA. The text in Section IV and Table 15 should be revised to reflect the actual status of TCE toxicity values. The values presented in Table 15 may be used for characterizing TCE risks. However, a separate calculation of TCE risks must be performed using the provisional high-end cancer slope factor and the RfD from USEPA's 2001 TCE risk assessment, and discussed as an uncertainty in Section VI of the HHRA.

    Response: As requested, the reference columns for TCE toxicity values in Table 15 will be changed from "N" to "W" (withdrawn), a line containing the draft values from EPA's 2001 draft health risk assessment (*Trichloroethylene Health Risk Assessment: Synthesis and Characterization.* External Review Draft. EPA/600/P-01/002A. U.S. Environmental Protection Agency Office of Research and Development. Washington, DC) will be inserted, and potential risks/hazards associated with the two sets of values will be calculated and discussed.

    The following text will be added to the end of the first paragraph on page 21: "The systemic and carcinogenic effects of TCE have been under EPA review for a number of years, and recently proposed values (EPA 2001[4]) are being reevaluated. In the absence of approved toxicity criteria available for this compound, both withdrawn and proposed values will be used in the HHRA."

37. Table 16: The footnotes are not presented on Table 16, so that the physical and chemical properties can be verified. Please add the footnotes to this table. Note that the BCF value for cadmium is considerably understated. Additional information

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[4] EPA (2001). *Trichloroethylene Health Risk Assessment: Synthesis and Characterization.* EPA/600/P-01/002A.

needs to be provided to justify a BCF of 50 for cadmium. Also, bioconcentration of arsenic and lead into fish needs to be calculated and included in the HHRA.

Response: The footnotes for Table 16 were inadvertently omitted, and will be included in the revised HHRA. The BCF for cadmium was obtained from *Bioaccumulation and Bioconcentration Screening*, Savannah River Site, Environmental Restoration Division. Manual ERD-AG-003, April 6, 1999. We consider this source to be authoritative, and this BCF value appropriate for estimating uptake of bioavailable cadmium into the edible tissues of fish as (1) biomagnification of cadmium is reported to occur only in lower aquatic trophic levels (*e.g.*, Eisler 1985[5]), (2) whole-body bioconcentration factors for cadmium in fish are usually less than 100 and may be less than 1 (*e.g.*, Hoffman *et al.* 1995[6]), and (3) cadmium concentrations are highest in fish kidneys, gills, and liver, and relatively low in muscle tissue (*e.g.*, de Conto Cinier *et al.* 1999[7]). Because arsenic and lead were not selected as surface water COPCs (HHRA Table 6), potential biotransfer of these metals into fish was not considered.

38. Page 27, Equation 6: Calculation of a default PEF does not provide an adequate air pathway analysis of potential dust emissions from the Site, and as presented in the HHRA may substantially understate the target levels in soil for the inhalation exposure pathway. As described on page ES-1, the Site covers 132 acres, of which some fraction represents potential dust emissions sources. The inverse dispersion coefficient (Q/C) value represents a ½ acre source area with an assumed fraction of vegetative cover of 0.5. Therefore, it is not be appropriate to apply the PEF to surface areas larger than ½ acre. Please recalculate the Q/C value so that it represents the size of the Site and the actual extent of vegetative cover.

Response: Dust inhalation is a relatively insignificant exposure pathway at the Site, and modification of the PEF to reflect a larger source area would result in little change in Tier 1 screening levels. Moreover, it is not known what assumptions about source area or vegetative cover might be more appropriate than the default values considered sufficiently conservative for screening purposes. Nonetheless, PEF values will be recalculated assuming a source area size of 132 acres, assuming 50% vegetative cover, in accordance with EPA soil screening level guidance (EPA 2002) (this degree of coverage is considered conservative as the majority of the Site is vegetated).

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[5] Eisler, R. (1985). *Cadmium Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review.* Contaminant Hazard Reviews Report No. 2. U.S. Department of the Interior Fish and Wildlife Service.

[6] Hoffman, D.J., Rattner, B.A., Burton, G.A., Jr. and Cairns, J., Jr. (1995). *Handbook of Ecotoxicology* Lewis Publishers.

[7] De Conto Cinier, C., Petit-Ramel, M., Faure, R., Garin, D., and Bouvet, Y. (1999). Kinetics of cadmium accumulation of elimination in carp *Cyrpinus carpio* tissues. *Comp Biochem Physiol C Pharmacol Toxicol Endocrinol* **122**:345-352.

As described previously, there are data gaps that preclude conducting a meaningful air pathway analysis for the site. The HHRA should include discussions of the uncertainties in the evaluation of the air pathway.

Response: Assuming that this part of the comment refers to release of dust from residue piles, please see response to Specific Comment 19.

Please confirm that the mean annual wind speed used in the emissions modeling reflects Site conditions.

Response: The default mean annual wind speed in the Hillsboro area of around 4.6 m/s is similar to the default value of 4.69 m/s in EPA soil screening level guidance (EPA 2002) that was used in the HHRA.

Please provide discussion in the HHRA of how the default threshold wind speed compares with the surface conditions and grain size distribution in surface soils and residue piles (for example, if the mode particle size in onsite surface materials is smaller than the default assumption, the threshold wind speed used is not conservative). Note that if the annual average wind speed and threshold wind speed are revised, then the F(x) value also will need to be recalculated.

Response: As indicated in the response to Specific Comment 19 (and others), the residue piles are not considered as potential exposure media in the HHRA. It is not known what assumptions about threshold wind speed and soil grain size distribution might be more appropriate than the default values considered sufficiently conservative for screening purposes in EPA guidance; as such, there appears to be no reason to deviate from these values.

Target levels in soil for the inhalation exposure pathway will need to be recalculated to incorporate the revised PEF.

Response: The change of the source area size from 0.5 acre to 132 acres results in an approximately two-fold increase in the estimated incremental lifetime risk or hazard via the dust inhalation route. These changes will be incorporated into the HHRA.

39. Section VI and Tables 17-28: Based on the previous comments, revisions to the HHRA are required that will result in changes to the screening levels, estimated risks and characterization of risks associated with the Site. However, the tables contain several spreadsheet glitches (#NAME? error messages) that should be corrected before resubmitting the HHRA.

Response: All tables will be updated and proofed prior to re-submission of the HHRA.

If you have any questions or would like to further discuss any of the responses, please do not hesitate to contact us.

Sincerely,

ENVIRON International Corporation

F. Ross Jones

F. Ross Jones, P.G.
Manager

FRJ:rms
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